MR. VALENTINE'S SUBSTITUTE FOR THE IRON RAIL.

At a recent meeting of the projectors of the Waterford and Kilkenny Railway, Mr. Valentine stated it to be his intention to substitute for the iron rail the wooden rail lately introduced; and this wood to be prepared by a process for chemically transmuting the timber by the injection of two salts, alkaline and metallic, which, by decomposition, produced insolubility, destroyed the vegetable quality, and, acting on the petrifying principle of nature, prevented the decay of the wood; but though it would seem thus petrified, still its elasticity was not destroyed. He would state an experiment which he made a short time since with hydraulic pressure upon a piece of beech 3½ inches square; he placed on it the segment of a wheel of iron, and then laid upon it the weight of 140 tons, which, had not the wood undergone the process before described, would have had the effect of completely crushing it: it was indented three-eighths of an inch, but when the weight was removed, the deflexion was lessened one-eighth of an inch, and in a fortnight it completely recovered its original figure. He considered that the result of the experiment fully justified him in saying that any weight to which it might be subjected, when laid down, would not crush the wood, because a rail would never be subjected to more than six or seven tons at a time. He further stated that it was allowed on all hands that not only the rails but the engines and the carriages could be constructed with the greatest economy, and it might be calculated that in the first formation of the line the expense would be reduced thirty per cent., with the same or even a greater degree of efficiency. There were also other advantages in this system; ground could be passed over which would render the formation of lines on other principles impracticable, and it also admitted of the use of curves of a small radius to allow of passing round the demesnes and houses of gentlemen; extensive excavations of embankments were avoided, and it was next to an impossibility that the carriages would run off the rails, as might be observed by examining the model. The wooden rail which he now produced had been subjected to the Kyanising process, and had absolutely for a length of time formed a portion of a line over which an engine had passed 28,000 times. It was a piece of Scotch fir, which in its natural state was well known to be one of the softest woods, and yet it might be seen that not the slightest friction or abrasion had taken place, and even the saw marks had not been obliterated. The rails should be formed square, and as soon as one side was worn the rail could be turned, till the whole sides had performed their duty.

THE LIGHTNING CONDUCTOR OF THE ROYAL EXCHANGE.

The citizens of London must feel a satisfaction in knowing that their new Exchange is protected against one form of the element by which the former edifice was razed to the ground; it is to be hoped that the example set in this instance will be followed out as a general rule, and not be the exception; and that our temples and our national edifices may not stand, as they constantly do, boldly thrust up into the region of storms, as if daring the fury of the tempest, and invoking down its vengeance.

Mr. Walker, the gentleman under whose superintendence the conductor in question has been erected, thus describes its construction, and the method adopted in fixing it:—

The lightning conductor of the Royal Exchange has been erected essentially as a conductor of lightning; it is not placed there under the idea that it will avert a lightning-flash by draining the cloud of its electrical contents; nor will it invite a lightning-flash by any attractive power inherent in itself; but it is there, ready to receive any flash that may strike it, and to conduct it in safety to the earth. It is presumed that the time may come when a cloud shall pass over the tower at the precise moment when its electrical contents are in such a state of "tottering equilibrium," that its inductive action on the conducteous bodies there present will be sufficient to overthrow this equilibrium and cause the discharge. The apex of the conductor is, therefore, so presented to the cloud, as to be more accessible to the flash than any other conducteous body; and with the broad fact before us, that the flash is journeying onward to the earth, and will arrive there by the course opposing least resistance, every precaution is taken not merely that the conductor shall be the path presenting least resistance, but that it shall be a path large enough to convey away any lightning flash whatever. In other words, we presume that the conductor may one day be struck with lightning; and, knowing that the object of the lightning is to reach the earth with the least possible opposition, we provide for it a path, not only efficient in itself, but likewise more efficient than any other vicinal path or paths.

The conductor is a copper rod three-quarters of an inch in diameter—a size more than sufficient to conduct safely the largest lightning flash; for experience has not furnished us with any cases wherein a mass of copper of only half an inch in diameter has been melted by lightning; while many instances are extant of heavy discharges being safely conducted by smaller rods. It commences with a rod of copper, tipped and pointed with platinum, erected on the back of the grasshopper vane, immediately over the spindle, and terminated in a fureated form within a pit sunk near the base of the tower. As a lightning conductor is a most dangerous appendage unless its base is very effectually connected with the subsoil, the greatest attention has been paid to this point. The pit was sunk through the concrete until the native gravel was fairly entered; the fureated terminating portion was then attached, so as to reach to the bottom of the pit; a ton or two of the graphite, obtained from gas retorts, was broken small, and thrown into the pit, so as completely to bury the furcations. The hole was then filled up. I may mention that this material, besides being indestructible, is an excellent conductor of electricity; and that it is employed in order to present as large a conducting surface to the soil as possible, and so to facilitate the escape of the charge, and thus make the conductor in every respect the path opposing least resistance.

Fall of a Stalk at St. Rollox.—On Friday week a stalk 240 feet in height, situated at the corner of the works at St. Rollox, immediately adjoining the Glasgow and Garnkirk Railway, gave way at the foundation, and in an instant not one brick was left above another. This stalk, we understand, was only finished a few weeks ago, and about the same time it was discovered that its base was not secure. Means were accordingly taken to insure its stability by propping and otherwise, and little fear was entertained but that it would stand awhile. Its descent was almost perpendicular, and it therefore occasioned little additional damage, for although a portion of the bricks fell within the railway depôt, and upon the rails, no further accident was the result. Several men who were working close by the stalk heard it cracking a few seconds before it fell, and, fortunately, having quickly left its vicinity, escaped.—*Caledonian Mercury.*

New Powder Mills on Dartmoor.—Last week an application was made to the magistrates at Quarter Sessions for permission to erect powder mills on Dartmoor. The court granted a license for this purpose to Messrs. George Frean and Co., of Plymouth. These mills will be erected on the Cherry Brook estate. The site is ten miles from Two Bridges. The nearest point of the mills to the turnpike road is 728 yards. The nearest point of the magazine to the road is 520 yards. The distance between the mills and the magazine will be 1,200 yards.

Public Walks, &c., in Birmingham.—The mayor, in compliance with a requisition most numerously and influentially signed, has called a public meeting at the Town Hall for Tuesday, the 19th inst., "to consider the propriety of taking efficient measures for promoting the establishment of public baths, and the formation of public walks, or other open spaces, for exercise and active sports, for the use of the people of this borough."—*Birmingham Herald.*

LIST OF NEW PATENTS RELATING TO ARCHITECTURE, ENGINEERING, &c., GRANTED FOR ENGLAND.

Furnished by Mr. A. Prince, of the Office for Patents of Inventions, Lincoln's-Inn Fields.

[SIX MONTHS FOR ENROLMENT.]

Thomas, William, of Cheapside, merchant, for improvement in looms. (Being a communication.) October 3.

Newton, William, of Chancery-lane, civil engineer, for improvements in machinery for letter-press printing. (Being a communication.) October 3.

Ritchie, William Henry, of Lincoln's-inn, gentleman, for improvements in obtaining copper from ores. (Being a communication.) October 10.

Brown, John Bowyer, of Sheffield, merchant, for improvements in combining cast-steel with iron, and in the construction of carriage springs. October 10.

Chabert, Joseph Eugene, of Chancery-lane, gentleman, for improvements in preparing materials to be used in making picture and other frames, and for architectural and other purposes. October 10.

Robinson, Henry Oliver, of Old Jewry, engineer, for certain improvements in steam machinery, and apparatus, for the manufacture and refining of sugar. October 10.

Hurwood, George, of Ipswich, engineer, for improvements in apparatus for moving and fastening windows. October 14.

Hamond, Sir Graham Eden, baronet, K.C.B., of Norton Lodge, Yarmouth, for improvements in the mode of fastening on and reefing paddle-wheel, float-boards, or paddles. (Being a communication.) October 14.

Borrie, Peter, of Princes-square, St. George's in the East, civil engineer, for certain improvements in the machinery for the manufacture of sugar. October 27.

Parsey, Arthur, of Spur-street, Leicester-square, artist, for improvements in obtaining motive power. October 17.

Wright, Alexander, of Hale's-place, South Lambeth, engineer, for certain improved apparatus for measuring gas, water, and other fluids, and in the means of manufacturing the same. October 17.

Maberly, Frederick Herbert, of Stowmarket, clerk, Geary, Stephen, of Hamilton-place, New-road, architect, and Croucher, Joseph, of James-street, Buckingham-gate, gentleman, for certain improvements in the construction and arrangement of machinery or apparatus for clearing, cleansing, watering, breaking up, and raking of streets, roads, lands, and other ways. October 17.

Grieve, John, of Portobello, Scotland, engineer, for certain improvements in the production and use of steam applicable to steam-engines. October 17.

Nasmyth, James, of Patricroft, Lancaster, engineer, and May, Charles, of Ipswich, engineer, for improvements in working atmospheric railways, and in machinery for constructing the apparatus employed therein. October 22.

Ransome, Frederick, of Ipswich, caster, for improvements in the manufacture of artificial stone for grinding and other purposes. October 22.

Osmond, George, of London-street, Tottenham-court-road, cabinet-maker, for improvements in fastenings for doors, drawers, window-sashes, and dining-tables, and in apparatus for suspending looking-glasses and other articles. October 22.

Poole, Moses, of London, gentleman, for improvements in machinery for emptying privies and cesspools. (Being a communication.) October 22.

Parkes, Alexander, of Birmingham, artist, for improvements in the manufacture of alloys, or combination of metals, and in depositing certain metals. October 29.

D'Harcourt, George Robert, of Old Jewry, gentleman, for improvements in ascertaining and checking the number of checks or tickets which have been used and marked, applicable for railway offices, and other places. October 29.

Fuller, Thomas (of the firm of Williams, Collier, and Co.), of Manchester, engineer, for certain improvements in machinery, tools, or apparatus for turning, boring, and cutting metals and other substances.

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